

# PATENT ABSTRACTS OF JAPAN

(11) Publication number : 2001-084875  
(43) Date of publication of application : 30. 03. 2001  
(51) Int. Cl. H01H 25/04 , B60K 35/00 , B60K 37/00 , B60K 37/06  
B60R 16/02 , B62D 1/18 , // H04N 5/00  
(21) Application number : 2000-067569  
(71) Applicant : ALPS ELECTRIC CO LTD  
(22) Date of filing : 10. 03. 2000  
(72) Inventor : ONODERA MIKIO , NUMATA HIDETAKA  
(30) Priority  
Priority number : 11200949 11200952  
Priority date : 14. 07. 1999 14. 07. 1999  
Priority country : JP JP  
(54) ON-VEHICLE INPUT DEVICE  
(57) Abstract:

**PROBLEM TO BE SOLVED:** To provide an on-vehicle input device excellent in operability and facilitating the selection of a desired on-vehicle electric apparatus and the function adjustment thereof by using a manual operation part only.

**SOLUTION:** A ROM 41 provided in a computer stores tables 45a, 45b, 45c, etc., expressing relations among the direction of operation of the manual operation part 3, the amount of operation thereof, and external force applied thereto by electric motors 19a, 19b. A CPU 41 determines the direction and size of external force to be loaded onto the operation part 3 base on positional information outputted from encoders 21a, 21b and on the tables 45a, 45b, 45c, etc., to drive the motors 19a, 19b by means of a motor driver 47. This enables an operator to take in a feel of resistance produced on the operation part 3 and to perform delicate operation of the operation part 3, thus facilitating the function adjustment of an on-vehicle electric apparatus. When the operation part 3 is operated to its movable limit, by loading a large external force thereon, the operator can take in the movable limit of the operation part 3, thus facilitating the selection of an on-vehicle electric apparatus.

## CLAIMS

[Claim(s)]

[Claim 1] An input unit for mount which is equipped with the following and characterized by carrying out the load of the external force beforehand set as said actuation shaft according to a control input of said manual operation section from said actuator when it is operated within movable limits which were able to define said manual operation section beforehand. The manual operation section An actuation shaft connected with the manual operation section concerned A position sensor which outputs a position signal according to the actuation direction and a control input of said manual operation section An actuator which acts external force of the actuation direction on said actuation shaft

[Claim 2] An input unit for mount which is equipped with the following and characterized by carrying out the load of the external force beforehand set as said actuation shaft according to the actuation direction and a control input of said manual operation section from said actuator when it is operated in the direction of [ other than a movable range which was able to define said manual operation section beforehand ]. The manual operation section An actuation shaft connected with the manual operation section concerned A position sensor which outputs a position signal according to the actuation direction and a control input of said manual operation section An actuator which acts external force on said actuation shaft

[Claim 3] An input unit for mount according to claim 1 characterized by holding said actuation shaft free [ a splash ] by bearing

[Claim 4] An input unit for mount according to claim 1 characterized

by for said actuation shaft fixing to a slider and sliding on a rail top.

[Claim 5] An input unit for mount according to claim 1 with which said manual operation section is characterized by having come to be able to carry out both-way actuation only in a specific one direction.

[Claim 6] An input unit for mount according to claim 1 characterized by the ability of said manual operation section to operate it now in the direction of arbitration in a specific field

[Claim 7] An input unit for mount according to claim 1 to 6 characterized by said actuator being a voice coil motor.

[Claim 8] An input unit for mount according to claim 1 characterized by carrying out the load of the oscillation of the mode which carries out the load of the big external force one by one to said actuation shaft from said actuator, or is different as a control input of said manual operation section becomes large.

[Claim 9] An input unit for mount according to claim 1 characterized by carrying out the load of the external force more shocking than said actuator on said actuation shaft when operated to an actuation limit that said manual operation section was defined beforehand.

[Claim 10] Classification of a mounted electrical machinery and apparatus chosen when it connected with a display and an electric target with which an automobile was equipped through a computer with which an automobile was equipped and said position sensor operated said manual operation section. An input unit for mount according to claim 1 with which the content of the function of the mounted electrical machinery and apparatus concerned adjusted by operating said manual operation section and activity of said manual operation section are characterized by what is displayed on said display.

[Claim 11] An input unit for mount according to claim 10 characterized by said mounted electrical machinery and apparatus being a sheet adjusting device for controlling a position of a driver's seat or a passenger seat.

[Claim 12] An input unit for mount according to claim 10 characterized by being tilt equipment and TERESUKO equipment with which a steering system for said mounted electrical machinery and apparatus to adjust height of a handle was equipped.

## DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to the input unit for mount which operates the mounted various electronic equipment intensively in the one manual operation section, and relates to a means to improve the operability of the input unit concerned especially.

[0002]

[Description of the Prior Art] Although the automobile in recent years is equipped with various kinds of electronic equipment, such as an air-conditioner, radio, television, a CD player, and a navigation system, when it is going to operate such much electronic equipment according to an individual with the actuation object with which each was equipped, there is a possibility of causing trouble to an automobilism. Then, in order to enable it to perform easily an on-off change, a selection of function, etc. of desired electronic equipment, without barring a safety operation, the input unit for mount whose various actuation of various kinds of electronic equipment is conventionally attained by operating the one manual operation section is proposed.

[0003] The conventional technology of this input unit for mount is explained referring to drawing 28 - drawing 31. However, inner surface drawing of the automobile which drawing 28 shows the example

of installation of the input unit for mount, the side elevation of the input unit for mount with which the conventional proposal of drawing 29 is made, the plan of the manual operation section of the input unit for mount which shows drawing 30 to drawing 29, and drawing 31 are the plans of the guide plate included in the input unit for mount shown in drawing 29.

[0004] As shown in drawing 28, the input unit 100 for mount of this example is installed in the console box 200 prepared between the automobilism seat and the passenger seat. And the conventional input unit 100 for mount shown in drawing 29 The manual operation section 110 (refer to drawing 30) equipped with two switches 111, 112 for a click, and three revolution mold variable resistors 113, 114, 115 as a signal input means, X-Y table 120 driven to the 2-way (the direction which intersects perpendicularly with the space of drawing 29, and longitudinal direction of a graphic display) which intersects perpendicularly mutually by this manual operation section 110. The stick controller 130 as a position signal input means which inputs the signal according to the direction of operation and the amount of actuation of this X-Y table 120 into an external instrument. It is mainly constituted by the engagement pin 160 which protruded on the underside of X-Y table 120, and the guide plate 140 (refer to drawing 31) which has an engagement relation.

[0005] The manual operation section 110 and X-Y table 120 are unified through the connecting shaft 150, and X-Y table 120 and the guide plate 140 are being engaged by inserting the point of the engagement pin 160 in the guide slot 141 of a guide plate 140 movable. Although this guide slot 141 can be set as the configuration of the arbitration which is moved in the specific direction and deals in the point of the engagement pin 160, as shown, for example in drawing 31, the shape of a plan type can engrave the guide slot 141 of a cross-joint form on the upper surface of a guide plate 140, and the point of the engagement pin 160 can be moved to each edge of B, C, D, and E along with the 2-way which carries out an abbreviation rectangular cross from Center A. That is, by operating the manual operation section 110, the engagement pin 160 can be move along the guide slot 141 of a guide plate 140 through X-Y table 120, and the information (position signal) about that engagement location be output from the stick controller 130 in the condition of having locate the point of this engagement pin 160 in the every place points A, B, C, D, and E in the guide slot 141. So, the function (function which it is going to adjust) set as the actuation object of the electronic equipment currently mounted can be alternatively chosen using this position signal. And if a desired function of electronic equipment is chosen in this way, the selected adjustment and selected change of a function can be performed by operating suitably three revolution mold variable resistors 113-115 prepared in the manual operation section 110.

[0006] Thus, as shown in drawing 28, the input unit 100 for mount constituted is combined with the display 180 which displays the switching equipment 170 which chooses desired electronic equipment alternatively out of two or more electronic equipment currently mounted, the content operated with the name and the input unit 100 for mount of electronic equipment chosen by this switching equipment 170, the computer which control each of these equipments and which do not illustrate, and can operate now two or more electronic equipment intensively. In addition, switching equipment 170 is installed in the console box 200, and the actuation switches 171a-171e are arranged near the input unit 100 for mount, and are connected with the electronic equipment by which these actuation switches 171a-171e differ, respectively according to the individual. For example, supposing each actuation switches 171a-171e are connected according to the mounted air-conditioner, radio, television, the CD player, the navigation system, and the individual,

respectively Air-conditioner mode to the on-off change of an air-conditioner or the input unit 100 for mount can be specified by operating actuation switch 171a. Radio mode to the on-off change of radio or the input unit 100 for mount can be specified by operating actuation switch 171b. Similarly, mode assignment to the on-off change of electronic equipment and the input unit 100 for mount which correspond, respectively can be performed by operating other actuation keys 171c-171e. Moreover, the displays 180, such as a liquid crystal display, are installed in the legible location from the driver's seat, and said computer is installed in the console box 200.

[0007] Although the selection of function and functional adjustment of electronic equipment which were chosen by switching equipment 170 can be performed by operating the input unit 100 for mount, according to the class of selected electronic equipment, a selectable function differs from the function which can be adjusted by actuation of the input unit 100 for mount. For example, when switching equipment 170 is operated and it is specified as air-conditioner mode, Although the function of "air-capacity adjustment" will be chosen if the manual operation section 110 is operated, the engagement pin 160 is located in the edge B of the guide slot 141 of a guide plate 140 and the switch 111 for a click is pushed in and clicked. If the engagement pin 160 is located in the edge C of the guide slot 141 and the switch 111 for a click is clicked, the function of "adjustment of the blowdown location of a wind" will be chosen. If similarly the engagement pin 160 is located in the edges D and E of the guide slot 141 and the switch 111 for a click is clicked, "adjustment of the direction of the blowdown of a wind" and the function of a "temperature control" will be chosen, respectively.

[0008] And after choosing these functions, the function can be adjusted by operating suitably the revolution mold variable resistors 113-115. For example, the air capacity of an air-conditioner can be adjusted by operating the revolution mold variable resistor 113, when air-conditioner mode is specified by switching equipment 170 and "air-capacity adjustment" is chosen by the manual operation section 110, and when "adjustment of the blowdown location of a wind" is similarly chosen in air-conditioner mode, the blowdown location of the wind of an air-conditioner can be adjusted by operating the revolution mold variable resistor 114, 115. Moreover, when sound volume of radio can be adjusted by operating the revolution mold variable resistor 113 when radio mode is specified by switching equipment 170 and "volume control" is chosen by the manual operation section 110 and "tuning" is similarly chosen in radio mode, radio can be tuned up by operating the revolution mold variable resistor 114, 115.

[0009]

[Problem(s) to be Solved by the Invention] Since the input unit 100 for mount concerning the conventional example has regulated the actuation direction and operating range of the manual operation section 110 by inserting in the guide slot 141 of a guide plate 140 the point of the engagement pin 160 united with the manual operation section 110 through the connecting shaft 150 and X-Y table 120, when the point of the engagement pin 160 runs against the trailer of the guide slot 141, it can know the actuation limit of the manual operation section 110.

[0010] However, when the load of the excessive operating physical force is carried out to the manual operation section 110 depending on this configuration, there is a possibility of damaging the engagement pin 160 or the guide slot 141, and the operation of adjusting suitably the adjustment speed of the function of the mounted selected electrical machinery and apparatus according to the control input of the manual operation section 110 cannot be taken, either. Namely, the input unit 100 for mount concerning the

conventional example Have the composition that the revolution mold variable resistors 113-115 with which the manual operation section 110 was equipped perform functional adjustment of the mounted selected electrical machinery and apparatus, and cannot perform functional adjustment of a mounted electrical machinery and apparatus depending on the manual operation section 110, but as a matter of course The operation of adjusting suitably the adjustment speed of the function of the mounted selected electrical machinery and apparatus according to the control input of the manual operation section 110 cannot be taken. For this reason, the manual operation section 110 and the revolution mold variable resistors 113-115 must be used properly by turns, and the case where functional adjustment of the mounted selected electrical machinery and apparatus cannot be performed promptly may be produced.

[0011] the mount excellent in the operability to which the place which this invention is made in order to cancel the defect of this conventional technology, and is made into the technical problem can carry out desired selection and its functional adjustment of a mounted electrical machinery and apparatus easily using the manual operation section — business — it is in offering an input unit.

[0012]

[Means for Solving the Problem] An actuation shaft with which this invention was connected with the 1st at the manual operation section and the manual operation section concerned in order to solve the aforementioned technical problem. When it is operated within movable limits which were equipped with a position sensor which outputs a position signal according to the actuation direction and a control input of said manual operation section, and an actuator which acts external force of the actuation direction on said actuation shaft, and were able to define said manual operation section beforehand. External force beforehand set as said actuation shaft according to a control input of said manual operation section was made a configuration of carrying out a load from said actuator.

[0013] Since an operator can know a control input of the manual operation section sensuously by sensing external force by which a load is carried out from an actuator according to this configuration. By attaining delicate actuation of the manual operation section, only operating the manual operation section from an initial position to a spilling limit, and adjusting a control input of not only usage of choosing a desired mounted electrical machinery and apparatus but the manual operation section. It comes to be able to do usage of performing functional adjustment of a mounted selected electrical machinery and apparatus, and the operability of the manual operation section, as a result an input unit for mount can be raised. Moreover, since it is the configuration which carries out the load of the external force of predetermined reinforcement from an actuator to an actuation shaft, an actuation shaft or bearing is not damaged.

[0014] An actuation shaft with which this invention was connected with the 2nd at the manual operation section and the manual operation section concerned. When it is operated in the direction of [other than a movable range which was equipped with a position sensor which outputs a position signal according to the actuation direction and a control input of said manual operation section, and an actuator which acts external force on said actuation shaft, and was able to define said manual operation section beforehand], External force beforehand set as said actuation shaft according to the actuation direction and a control input of said manual operation section was made a configuration of carrying out a load from said actuator.

[0015] Since according to this configuration it becomes possible for an operator to be able to know correction of the actuation direction of the manual operation section sensuously by sensing this, and to operate the manual operation section only within movable limits, since the load of the external force from an actuator is carried out

to an actuation shaft when the manual operation section is operated in the direction of [other than a movable range which was able to be appointed beforehand], the operability of the manual operation section is improved.

[0016] This invention made an actuation shaft in said 1st technical-problem solution means a configuration of holding free [a splash to bearing] the 3rd. Since a configuration of an actuation shaft attaching part can be simplified according to this configuration, it can carry out cheaply.

[0017] This invention was made a configuration of having fixed said actuation shaft in said 1st technical-problem solution means to a slider, and sliding the 4th on a rail top. Since an actuation shaft can be operated in a fixed flat surface along with a rail according to this configuration, operability of an actuation shaft can be made good.

[0018] This invention made said manual operation section in said 1st technical-problem solution means a configuration that it could be made to carry out both-way actuation only in a specific one direction the 5th. Since selection of a desired mounted electrical machinery and apparatus, selected functional adjustment of a mounted electrical machinery and apparatus, etc. can be performed by carrying out both-way actuation of the manual operation section only in a specific one direction according to this configuration, operability of the manual operation section can be made good.

[0019] This invention made said manual operation section in said 1st technical-problem solution means a configuration of enabling it to operate it in the direction of arbitration in a specific field the 6th in order to solve the aforementioned technical problem. Since it enabled it to operate the manual operation section in the direction of arbitration in a specific field according to this configuration, while being able to increase the number of mounted electrical machinery and apparatus in which selection adjustment is possible, a class of function which can be adjusted can also be increased.

[0020] This invention was made a configuration of using a voice coil motor the 7th, as an actuator in said 1st thru/or 6th technical-problem solution means. Since a voice coil motor was used as an actuator which acts external force on the manual operation section according to this configuration, a device for changing rotation of a motor into a both-way rectilinear motion becomes unnecessary, and a miniaturization and low-cost-izing of an input unit for mount can be attained.

[0021] This invention was made a configuration of carrying out the load of the oscillation of the mode which carries out the load of the big external force one by one to said actuation shaft from said actuator, or is different the 8th as a control input of said manual operation section became large in said 1st technical-problem solution means. Since a control input of the manual operation section can be realized with blind touch according to this configuration, operability of an input unit for mount can be made better.

[0022] This invention was made a configuration called a load in external force more shocking than said actuator on said actuation shaft when operated to an actuation limit that said manual operation section was beforehand set to the 9th in said 1st technical-problem solution means. Since it can realize with blind touch that a control input of the manual operation section reached till a critical point according to this configuration, operability of an input unit for mount can be made better.

[0023] This invention said position sensor in said 1st technical-problem solution means to the 10th Classification of a mounted electrical machinery and apparatus chosen by connecting with a display and an electric target with which an automobile was equipped through a computer with which an automobile was equipped,

and operating said manual operation section. The content of the function of the mounted electrical machinery and apparatus concerned adjusted by operating said manual operation section and activity of said manual operation section were made a configuration of displaying on said display. According to this configuration, since a passenger can perform functional adjustment of a mounted electrical machinery and apparatus, checking the content of a display of a display, he can ensure [ promptly and ] the functional adjustment concerned.

[0024] This invention was made a configuration of operating a sheet adjusting device for controlling a position of a driver's seat or a passenger seat in the manual operation section the 11th, as a mounted electrical machinery and apparatus in said 10th technical-problem solution means. Since a hand can perform necessary actuation using the manual operation section according to this configuration, -izing of the position adjustment of a driver seat or a passenger seat can be carried out [ easy ].

[0025] This invention was made a configuration of operating tilt equipment and TERESUKO equipment with which a steering system for adjusting height of a handle was equipped in the manual operation section the 12th, as a mounted electrical machinery and apparatus in said 10th technical-problem solution means. Since a hand can perform necessary actuation using the manual operation section according to this configuration, -izing of the height adjustment of a handle can be carried out [ easy ].

[0026] <BR> [Embodiment of the Invention] Hereafter, the example of the 1st operation gestalt of the input unit for mount concerning this invention is explained, referring to a drawing.

[0027] The perspective diagram showing the installation condition to the dashboard of the input unit for mount which drawing 1 requires for the example of the 1st operation gestalt, and drawing 2 are the plans showing the indoor condition of an automobile that the input unit for mount concerning the example of the 1st operation gestalt was attached. The input unit 1 for mount concerning this example of an operation gestalt so that clearly from drawing 1 The case 2 is formed in the shape of [ of necessary magnitude ] an angle description machine. In the upper surface of the case 2 concerned Six push button switches 4a, 4b, 4c, 4d, 4e, and 4f arranged in the shape of [ consisting mainly of the manual scan section 3 and the setting-out section of the manual scan section 3 concerned ] radii. This, three push button switches 5a, 5b, and 5c arranged in the shape of a concentric circle, and volume tongues 6 are arranged by the periphery portion of the array location of the six push button switch groups concerned. Moreover, in the front face of the case 2 concerned, the card slot 7 and the disk slot 8 are established. As shown in drawing 2, this input unit for mount is attached between the driver's seat B of the dashboard A of an automobile, and a passenger seat C, has two incomes with the computer which was contained in Dashboard A by the indicating-equipment D list with which Dashboard A was equipped and which is not illustrated, and can demonstrate a necessary function now.

[0028] A total of nine above-mentioned push button switches 4a, 4b, 4c, 4d, 4e, and 4f, and 5a, 5b and 5c are connected with the mounted electrical machinery and apparatus which it is going to operate using the input unit 1 for mount, for example, an air-conditioner, radio, television, a CD player, a car-navigation system, etc. according to an individual. Although it can be set as arbitration, which push button switch and which mounted electrical machinery and apparatus are connected In the input unit 1 for mount of this example push button switch 4a Menu selection, Air-conditioner and push button switch 4d A car-navigation system, [ push button switch 4b ] [ telephone and push button switch 4c ] Radio and push button switch 4f The reader writer or disk drive equipment of a card, [ push button

switch 4e ] The on-off control of the liquid crystal shutter with which the attitude control of the input unit 1 for mount and push button switch 5b were prepared for push button switch 5a all over Display D. Push button switch 5c is connected to television, respectively, and the mounted electrical machinery and apparatus connected to the push button switch concerned can be chosen now by pushing in the knob of a desired push button switch. In order to prevent an operation mistake, an alphabetic character, a pictorial symbol, etc. which show each mounted electrical machinery and apparatus to which each switch was connected are displayed on the front face of the knob of each push button switch (graphic display abbreviation).

[0029] The perspective diagram of the device section 11 equipped with the manual scan section 3 and the manual scan section 3 concerned, as for drawing 3, the important section cross section which looked at drawing 4 from [ where it has the manual scan section 3 and the manual scan section 3 concerned / of the device section 11 ] the side, the important section cross section which looked at drawing 5 from [ of the device section 11 ] the flat surface, and drawing 6 are the plans of the manual scan section 3 which removed covering.

[0030] So that clearly from drawing 3 thru/or drawing 5 the device section 11 The base 12 attached in the base of a case 2, and the spherical bearing 13 prepared in the base 12, The actuation shaft 14 with which spherical section 14a prepared in mist or lower part approach from the center section was supported to revolve by spherical bearing 13 free [ a splash ]. The solenoid 15 arranged under the spherical bearing 13, and the clamp member 16 of the actuation shaft 14 attached in the upper bed section of driving shaft 15a of a solenoid 15. The two axes of rotation 17a and 17b arranged on the axis which intersects perpendicularly in a field parallel to the base 12 focusing on spherical bearing 13. Two main wheels 18a and 18b which fixed to the point of each axes of rotation 17a and 17b, Two electric motors 19a and 19b arranged at said each axes of rotation 17a and 17b and parallel, Two pinions 20a and 20b which fix on the main shaft of the electric motors 19a and 19b concerned, and are meshed with said main wheels 18a and 18b, Two encoders 21a and 21b which detect the hand of cut and rotation of a main shaft of said electric motors 19a and 19b, It consists of L character members 22a and 22b which change the splash of the direction of X of said actuation shaft 14, and the direction (refer to drawing 5 ) of Y into a revolution of the direction of X, and the direction of Y, and are transmitted to said axes of rotation 17a and 17b, and the manual scan section 3 is attached in the upper bed section of said actuation shaft 14.

[0031] The soffit section of the actuation shaft 14 is formed in the cone form which becomes so thin that it results caudad, and impression 16a of approximate circle drill type which can insert the point of the actuation shaft 14 is formed in the upper surface of this and the clamp member 16 which counters. Therefore, if ON actuation of the solenoid 15 is carried out and the clamp member 16 is gone up, the point of the actuation shaft 14 will be inserted into impression 16a, the actuation shaft 14 will be clamped, and a splash centering on spherical section 14a will be forbidden. On the other hand, if a solenoid 15 is turned off and the clamp member 16 is descended, engagement to the actuation shaft 14 and the clamp member 16 will be canceled, and the actuation shaft 14 will become rockable considering spherical section 14a as a center. In addition, about the on-off operation of a solenoid 15, it mentions later.

[0032] As main wheels 18a and 18b and pinions 20a and 20b, the usual gearing corresponding to specification is applicable, and also in order to lose backlash, especially the thing for which that by which the device was made is used is desirable. Since backlash is lost, as a device, elastic bodies, such as rubber, can be arranged into the addendum portions of main wheels 18a and 18b and/or Pinions 20a

and 20b, and it can mention engaging main wheels 18a and 18b and Pinions 20a and 20b through the elastic body concerned.

[0033] It \*\*\*\*s to one side of the L character members 22a and 22b, a hole 23 is established, and the long hole-like actuation shaft breakthrough 24 is established the other sides. As shown in drawing 4, these L character members 22a and 22b are in the condition which penetrated the actuation shaft 14 to the actuation shaft breakthrough 24, and are concluded by the side of main wheels 18a and 18b on the screw 25 which one side \*\*\*\*ed and was inserted in the hole 23. In order that the breadth of the actuation shaft breakthrough 24 may make small the backlash produced between the actuation shafts 14, it is the range which can secure the smooth slide of the actuation shaft 14, and is formed in the value near the diameter of the actuation shaft 14 if possible. Moreover, the length of the actuation shaft breakthrough 24 is the same as the movable range of the actuation shaft 14, or is set as a bigger value than it. Therefore, if the manual operation section 3 is grasped and the actuation shaft 14 is rocked from a center location The L character members 22a and 22b circle with the rotation according to the direction component of X, and the direction component of Y. The revolution is transmitted to each encoders 21a and 21b through main wheels 18a and 18b and Pinions 20a and 20b, and the hand of cut and rotation of the actuation shaft 14 are detected by the computer set up in Dashboard A.

[0034] As are shown in drawing 3 and drawing 4, and it is formed in the center section of the nuchal plane in the shape of [which has the transparence aperture 31] a dome and is shown in the interior at drawing 4 and drawing 6, the manual operation section 3 It consists of a photo interrupter 33 which consists of combination of the circuit board 32, and the light emitting device and photo detector which were mounted in said transparence aperture 31 of the circuit board 32 concerned, and the portion which counters, and the 1st and 2nd switches 34 and 35 mounted in the periphery of said circuit board 32.

[0035] When the light of the specific wavelength concerned carries out incidence to the photo detector which emits the light of specific wavelength, for example, infrared radiation, and is not illustrated from the light emitting device which is for carrying out on-off control, and does not illustrate said solenoid 15, a photo interrupter 33 carries out ON control of said solenoid 15, and said clamp member 16 is descended, engagement on the clamp member 16 and said actuation shaft 14 concerned is canceled, and it makes splash actuation of the actuation shaft 14 possible. In addition, the signal transmission from the current supply and the photo interrupter 33 concerned to the photo interrupter 33 concerned is performed by the code 28 inserted in the actuation shaft 14.

[0036] On the other hand, as said 1st and 2nd switches 34 and 35, it has each function of a revolution detection actuation switch and a pushing detection actuation switch, and that by which the knob is arranged in the center location is used at the time of un-operating the switch concerned. As this kind of a switch, an applicant for this patent can do patent application first, and can mention what was indicated by JP, 9-274830, A. As shown in drawing 6 from a center location, it is set as the peripheral face of the manual scan section 3 by bilateral symmetry, and revolution actuation can be carried out in the direction of arrow head (\*\*) or (\*\*) along with the peripheral face of the manual scan section 3, and also it pushes in in the direction of an arrow head (Ha), and the 1st and 2nd knobs 34a and 35a which operate these 1st and 2nd switches 34 and 35 can be operated.

[0037] Moreover, these 1st and 2nd switches 34 and 35 are set up so that each actuation direction of the 1st and 2nd knobs 34a and 35a and the function switched by this may become the same. Namely,

although these 1st and 2nd switches 34 and 35 are used as a switch which switches the function of the mounted electrical machinery and apparatus chosen by operating the push button switches 4a, 4b, 4c, 4d, 4e, and 4f set as the upper surface of a case 2 The same function of the mounted selected electrical machinery and apparatus is switched by operating the 1st switch 34 and the 2nd switch 35 in the same direction. When push button switch 4c is operated and an air-conditioner is chosen, for example, the 1st switch 34 and the 2nd switch 35 The laying temperature of an air-conditioner is gone up by operating the 1st and 2nd knobs 34a and 35a in the direction of arrow head (b). By operating the 1st and 2nd knobs 34a and 35a in the direction which is arrow head (\*\*), the laying temperature of an air-conditioner is descended and on-off control of the air-conditioner is carried out by operating the 1st and 2nd knobs 34a and 35a in the direction of an arrow head (Ha).

[0038] Thus, if each actuation direction of the 1st and 2nd knobs 34a and 35a and the function switched by this are identified Also when a car with right-hand steering is equipped with the mounted input unit concerning this example of an operation gestalt Moreover, since the same functional change over can be performed by operating the knob which sees from an operator and becomes the same physical relationship in the same direction also when a left-hand-drive car is equipped An operator cannot commit a failure easily, the input unit for mount of the same configuration can be applied also as an object for left-hand-drive cars also as an object for cars with right-hand steering, and the versatility of a mounted input unit is raised. Moreover, since the switch with which the manual operation section 3 concerned was equipped also from the passenger seat can be operated with the same sensation also from a driver's seat by using 1st knob 34a and 2nd knob 35a properly, it is hard to commit a failure and the operability of a mounted input unit can be raised.

[0039] Electric motors 19a and 19b are for giving a feeling of resistance to actuation of the manual operation section 3, for example, are applied to arrest point regulation of the manual operation section 3 etc. at regulation of the operating speed according to regulation of the actuation direction of the manual operation section 3, and the control input of the manual operation section 3, and a list.

[0040] That is, since the manual operation section 3 performs selection of the mounted electrical machinery and apparatus which it is going to control by rocking in the specific direction, and selected functional adjustment of a mounted electrical machinery and apparatus, unless it can operate it in the direction defined beforehand at accuracy, it cannot perform selection or functional adjustment of a mounted electrical machinery and apparatus to accuracy. Then, although actuation of the manual operation section 3 to the direction defined beforehand can be performed by the small operating physical force, for actuation of the manual operation section 3 to the other direction, electric motors 19a and 19b are driven, the load of the torque of the actuation direction and an opposite direction is carried out to the actuation shaft 14, and a feeling of resistance is given to actuation of the manual operation section 3. By this, since an operator can know sensuously having operated the manual operation section 3 in the direction which is not planned, he can prevent beforehand the false drop of a mounted electrical machinery and apparatus, and the error of functional adjustment.

[0041] Moreover, when the manual operation section 3 tends to be operated and it is going to perform functional adjustment of a mounted electrical machinery and apparatus (for example, when it is going to change the laying temperature of an air-conditioner), when the control input of the manual operation section 3 is small, change over of laying temperature is performed gently, but if the control

input of the manual operation section 3 is enlarged, change over of laying temperature will be performed at high speed. For this reason, if there is no feeling of resistance in actuation of the manual operation section 3 in any way, since the control input of the manual operation section 3 will tend to become large, about the minor change of laying temperature, it becomes difficult accuracy and to carry out promptly and operability will become bad. Then, when the control input of the manual operation section 3 becomes to some extent large, electric motors 19a and 19b are driven, the load of the torque of the actuation direction and an opposite direction is carried out to the actuation shaft 14, and a feeling of resistance is given to actuation of the manual operation section 3. Since it can know sensuously that an operator's control input of the manual operation section 3 is too large to tune the laying temperature of an air-conditioner finely with this, laying temperature of an air-conditioner can be finely tuned correctly and promptly by making small the control input of the manual operation section 3. In addition, it can replace with the configuration which gives a feeling of resistance to actuation of the manual operation section 3 in the phase in which the control input of the manual operation section 3 became to some extent large, and it can also constitute so that sequential grant of the different feeling of resistance may be carried out at the manual operation section 3 according to the control input of the manual operation section 3. Moreover, although the above-mentioned explanation explained taking the case of the case which increases the control input of the manual operation section 3 where it is alike, therefore adjustment speed, such as laying temperature of an air-conditioner, increases, for example, also when [which the operating speed of the manual operation section 3 increases] it is alike, therefore adjustment speed increases, a feeling of resistance can also be given to the manual operation section 3 by the same method.

[0042] Furthermore, if a mechanical method, for example, the method of making the edge of spherical bearing 13 attach the actuation shaft 14, is taken as a means to regulate the actuation limit of the manual operation section 3. Since big mechanical power acts on the attachment section of these spherical bearing 13 and the actuation shaft 14 and wear arises whenever it operates the manual operation section 3, wear powder enters between spherical section 14a of spherical bearing 13 and the actuation shaft 14. It is easy to produce the inconvenience that the operating physical force of the actuation shaft 14 becomes large, or the splash of the actuation shaft 14 becomes impossible in being the worst. Then, when the manual operation section 3 is operated to the location defined beforehand, electric motors 19a and 19b are driven, and the load of the shocking torque is carried out to the actuation shaft 14 in the actuation direction and an opposite direction, for example. If it does in this way, attachment with the edge of spherical bearing 13 and the actuation shaft 14 is prevented, generating of wear powder is reduced and he can prevent beforehand the above-mentioned inconvenience resulting from generating of wear powder while he can suspend actuation of the manual operation section 3 beyond it, since an operator can know sensuously having operated the manual operation section 3 to the actuation limit. Moreover, by the torque of electric motors 19a and 19b, the manual operation section 3 can be automatically returned to a center location, and operability of the manual operation section 3 can be made good.

[0043] In addition, it is possible it not only to give a feeling of resistance to the manual operation section 3, but to apply external force to the sense to which the manual operation section 3 is moved. For example, when adjusting the sound volume of the radio mentioned later or a CD player, when moving the manual operation section 3 in the direction downed in sound volume, the load of the external force can be reversely carried out at the manual operation section 3 so

that a feeling of acceleration may be sensed, so that a feeling of resistance may be sensed, when moving the manual operation section 3 in the direction which raises sound volume. Since sound volume can be promptly extracted to down sound volume while being able to cancel the inconvenience that the sound which comes out to the vehicle interior of a room becomes large suddenly, in case sound volume is raised if it does in this way, the inconvenience that conversation is prevented from listening or the conversation of an audio is cancelable.

[0044] Control of each [these] electric motors 19a and 19b is performed according to the command from the computer which it had in Dashboard A. Hereafter, the control method of the electric motors 19a and 19b performed by computer concerned is explained based on drawing 7 thru/or drawing 11. Explanatory drawing which illustrates the classification of the mounted electrical machinery and apparatus with which drawing 7 is chosen by the actuation direction of the manual operation section 3, and it, Explanatory drawing which illustrates the classification of the function in which drawing 8 is switched by the actuation direction of the manual operation section 3, and it, The block diagram in which drawing 9 shows the control system of electric motors 19a and 19b, the table Fig. showing an example of the data table memorized by the memory by which the computer was equipped with drawing 10, and drawing 11 are flow charts which show the control procedure of electric motors 19a and 19b.

[0045] As shown in drawing 7 (a) and (b), the mounted input unit 1 of this example can choose now radio, an air-conditioner, a car-navigation system, a CD player, television, a surveillance camera, an electronic mail, and a telephone, respectively by operating the manual operation section 3 in each direction of the left and the forward left behind the left behind the forward right, the right, and the right a front [location / center]. In addition, classification of the electrical machinery and apparatus chosen by operating the classification and the manual operation section 3 concerned of the electrical machinery and apparatus chosen by the push button switches 4a, 4b, 4c, 4d, 4e, and 4f with which the mounted input unit 1 was equipped, and 5a, 5b and 5c can also be made into the combination of an electrical machinery and apparatus of the same kind, and can also be made into the combination of an electrical machinery and apparatus of a different kind. In this example of an operation gestalt, classification of the electrical machinery and apparatus chosen by operating the classification and the manual operation section 3 of an electrical machinery and apparatus which are chosen by the push button switches 4a-4f, and 5a-5c is made into the combination of an electrical machinery and apparatus of a different kind.

[0046] When television is chosen by operating the manual operation section 3 backward from a center location As shown in drawing 8 (a), by operating the manual operation section 3 forward from a center location A channel rise, Each functional adjustment of a sound volume down is attained by operating the manual operation section 3 backward from a center location by operating a sound volume rise and the manual operation section 3 leftward from a center location by operating a channel down and the manual operation section 3 rightward from a center location.

[0047] \*\* — when the number of the functions which should be adjusted by operating the manual-operation section 3 like is below "8" that is the maximum number of the movable direction of the manual-operation section 3, even if it operates the manual-operation section 3 in the direction of [other than the direction (each direction shown in drawing 8 (a)) assigned as an object for functional adjustment], functional adjustment of the mounted selected electrical machinery and apparatus cannot perform. If it has this neutral zone in the operating range of the manual operation



section 3, he is not desirable from a safety operation of an automobile while he lacks in actuation ease, since an operator has to operate the manual operation section 3 in the direction in which functional adjustment is possible carefully.

[0048] Then, in the input unit 1 for mount concerning this example of an operation gestalt, the aforementioned problem is solved by considering as the configuration which shows the control system of electric motors 19a and 19b to drawing 9 and drawing 10, and controlling electric motors 19a and 19b by the procedure shown in drawing 11.

[0049] namely, the tables 45a, 45b, and 45c which encoded the magnitude of the torque generated by revolution in the hand-of-cut list of the electric motors 19a and 19b according to the actuation field and each actuation field of the manual operation section 3 to ROM44 with which the computer concerned was equipped while forming the collating section 42 and the table selection section 43 in CPU41 with which the computer in Dashboard A was equipped, as shown in drawing 9... is memorized. Moreover, Display D is equipped with the position signal detecting element 46 which displays the actuation locus of the manual operation section 3, while downloading the signal from Encoders 21a and 21b to said computer and outputting the table selection signal according to the actuation field of the manual operation section 3 to said table selection section 43.

[0050] Drawing 10 is drawing showing an example of the table memorized by ROM44, and actuation and halt, and hand of cut of electric motors 19a and 19b when the manual operation section is operated in each field which divided equally eight in eight division into equal parts and the direction of Y, and was equally divided in the direction of X encode the movable range of the manual operation section 3, and it is displayed. As for the numeric character, actuation and halt and hand of cut of 1st electric-motor 19a, and the lower berth show [ the upper case ] actuation and halt, and hand of cut of 2nd electric-motor 19b, a sign '+' shows normal rotation of a motor and the sign '-' shows the inversion of a motor to the sign list indicated in each table. Moreover, it means that electric motors 19a and 19b do not rotate a numeric character '0', and means that electric motors 19a and 19b rotate a numeric character '1.' If this table is followed, the field of - (X3, Y0) (X3, Y7), (X4, Y0) When the manual operation section 3 is operated in the field of - (X4, Y7) - (X0, Y3) (X7, Y3) a field, and (X0, Y4) the field of - (X7, Y4) The feeling of resistance accompanying the revolution of electric motors 19a and 19b is not given to a motion of the manual operation section 3, without neither of the electric motors, 19a nor 19b, rotating. When the manual operation section 3 is operated in the field of others other than this, one of the electric motors 19a and 19b rotates at least, and the feeling of resistance accompanying the revolution of electric motors 19a and 19b is given to a motion of the manual operation section 3.

[0051] Therefore, as television is chosen first and by operating the manual operation section 3 shows to drawing 8 (a) [ when the manual operation section 3 is operated front, the back, the right, and leftward from a center location and functional adjustment of television is attained ] If the roll control of electric motors 19a and 19b is performed using the table of drawing 10 If the manual operation section 3 is operated from a center location in the directions of slant other than front, the back, the right, and the left Since one of the electric motors 19a and 19b rotates at least and the feeling of resistance accompanying the revolution of electric motors 19a and 19b is given to a motion of the manual operation section 3, an operator can know sensuously operating the manual operation section 3 to the neutral zone. Therefore, since it becomes possible to operate the manual operation section 3 in the direction which can perform desired functional adjustment, an

operator's actuation ease of the manual operation section 3 improves, and he does not check an automobilism

[0052] The roll control of the electric motors 19a and 19b in a computer is performed by the procedure shown in the flow chart of drawing 11.

[0053] That is, if an operator operates the manual operation section 3 in the direction of either from a center location (Procedure S1), through the L character members 22a and 22b, main wheels 18a and 18b, and Pinions 20a and 20b, Encoders 21a and 21b will rotate only the rotation proportional to the amount of splashes of the manual operation section 3 in the splash direction of the manual operation section 3, and will output a position signal to it. the position signal detecting element 46 with which the computer was equipped — this position signal — reading (Procedure S2) — the actuated valve position of the manual operation section 3 — deciding (Procedure S3) — transmission of the table selection signal to the table selection section 43 and transmission of the position signal to Display D are performed (procedure S4). The table selection section 43 of CPU41 chooses and incorporates a predetermined table from ROM44 based on the table selection signal from the position signal detecting element 46 (Procedure S5). The collating section 42 of CPU41 decides a motor output value from the position signal outputted from Encoders 21a and 21b, and the table incorporated by the table selection section 43, and outputs it to the motor driver 47 (Procedure S6). The motor driver 47 drives electric motors 19a and 19b according to a motor output value, and gives a feeling of resistance to a motion of the manual operation section 3 (Procedure S7). An operator realizes the feeling of resistance of the manual operation section 3, and changes the actuated valve position of the manual operation section 3 (Procedure S8).

[0054] In addition, these motor control means and methods are not only applicable to regulation of the actuation direction of the manual operation section 3 but applicable to grant of the feeling of resistance according to the above mentioned control input of the manual operation section 3, and grant of the feeling of resistance in the actuation limit of the manual operation section 3.

[0055] The input unit 1 for mount concerning this example of an operation gestalt constituted as mentioned above is attached possible [ longitudinal slide movement ] and possible [ dip ] to the dashboard A of an automobile. drawing 12 was seen from [ which shows the mounting device of the input unit 1 for mount over Dashboard A ] the flat surface — it is fracture drawing a part and drawing 13 was seen from [ the ] the side — it is fracture drawing a part.

[0056] On the base 51 prepared in Dashboard A, two advice shafts 52 and 53 and one ball screw 54 are mutually attached in parallel so that clearly from these drawings. The ball screw 54 is supported by bearing 55 free [ a revolution ], and the 1st motor 57 for order \*\* is connected with the end through the fastener 56. Moreover, the migration board 59 is attached in the ball screw 54 concerned possible [ longitudinal slide movement ] through the nut 58, and the migration board 59 concerned is attached in said advice shafts 52 and 53 free [ sliding ] through the slider 60. The axis of rotation 62 supported free [ a revolution ] by bearing 61 by the point of said migration board 59 is attached in the advice shafts 52 and 53, and a ball screw 54 and a right angle, and the case 2 of the input unit 1 for mount has fixed to the point of the axis of rotation 62 concerned. The main wheel 63 has fixed in said axis of rotation 62, and this main wheel 63 is meshed with the pinion 65 which fixed on the main shaft of the 2nd motor 64.

[0057] Therefore, the input unit 1 for mount can make it circle facing up or downward in a point to Dashboard A by being able to make it move forward or retreat to Dashboard A, and rotating normally or reversing the 2nd motor 64 by rotating normally or reversing the 1st

motor 57. Therefore, since the position of the input unit 1 for mount can be suitably changed so that an operator may tend to operate the manual operation section 3, and various kinds of push button switches 4a-4f, 5a-5c besides volume tongue 6 grade, the operability of the input unit 1 for mount can be raised further.

[0058] Attitude control of this input unit 1 for mount can also be performed by operating the manual operation section 3 and the push button switches 4a-4f which were carried in the input unit 1 for mount, and 5a-5c. That is, if push button switch 4a is pushed, the menu illustrated to Display D at drawing 14 will appear. Then, if the manual operation section 3 is operated and "the input unit for mount" is chosen from a menu, the image of the input unit 1 for mount as shown in Display D at drawing 15 will appear. If said 1st motor 57 will rotate normally, the input unit 1 for mount will move forward, if the manual operation section 3 is operated towards "Advance a", and the manual operation section 3 is operated towards "back space b" in this condition, said 1st motor 57 will be reversed and the input unit 1 for mount will retreat. Moreover, if said 2nd motor 64 will rotate normally, the point of the input unit 1 for mount will circle upward centering on the axis of rotation 62, if the manual operation section 3 is operated towards "Lifting c", and the manual operation section 3 is operated towards "Descent d", said 2nd motor 64 will be reversed and the point of the input unit 1 for mount will circle downward centering on the axis of rotation 62. If the same procedure can adjust the comfortableness of a driver's seat or a passenger seat if a "sheet" is chosen from a menu screen, and a "handle" is chosen from a menu screen, the same procedure can adjust the tilt of a handle, and telescopic one and height adjustment of a handle can be performed.

[0059] in addition, in changing positions, such as the input unit 1 for mount, and an above-mentioned sheet, besides an above-mentioned handle, by operating the manual operation section 3 The movable range of these devices and the feeling of resistance which joins the manual operation section 3 are associated mutually. For example, when the feeling of resistance which joins the manual operation section 3 is strengthened gradually or it results in the end of a movable range as the end of the movable range of a device is approached, especially the thing for which a table is set up so that a shocking feeling of resistance may be given to the manual operation section 3 is desirable. If it does in this way, since it can recognize whether the operator adjusted the device by the movable range throat top, utilization becomes convenience more.

[0060] \*\* — the input unit 1 for mount concerning the example of the 1st operation gestalt can choose the mounted electrical machinery and apparatus of the request which is going to perform functional adjustment like by operating the push button switches 4a-4f with which the upper surface of a case 2 was equipped, and 5a-5c, or operating the manual operation section 3. Moreover, after choosing a desired mounted electrical machinery and apparatus, functional adjustment of a mounted electrical machinery and apparatus can be performed by operating the 1st and 2nd switches 34 and 35 which operated it in the direction which was able to define the manual operation section 3 beforehand, or were formed in the manual operation section 3. Moreover, sound volume of radio, a television, besides a CD player, etc., etc. can be performed also by rotating the volume tongue 6. About the actuation direction of the manual operation section 3, it is displayed on the menu of a selectable mounted electrical machinery and apparatus, the menu in which the content of the function in which the adjustment about each mounted electrical machinery and apparatus is possible is shown, and it by Display D one by one with this input unit 1 for mount. Moreover, in the non-operating state of the manual operation section 3, the actuation shaft 14 is clamped by the clamp member 16, and the unjust

oscillation of the manual operation section 3 and generating of the noise accompanying an oscillation of an automobile are prevented. If a finger is held up above the manual operation section 3, the light of the specific wavelength from a light emitting device will carry out incidence to the photo detector of a photo interrupter 33, ON control of the solenoid 15 will be carried out, engagement will be canceled for the clamp member 16 and the actuation shaft 14, and the manual operation section 3 will become operational automatically.

[0061] In addition, in said example of the 1st operation gestalt, although the gear mechanism was used as a power transmission device which transmits the splash of the actuation shaft 14 to Encoders 21a and 21b, the summary of this invention is not limited to this and can also use power transmission devices of the arbitration which belongs well-known, such as a friction wheel and a belt device.

[0062] Moreover, in said example of the 1st operation gestalt, although Encoders 21a and 21b were used as a sensor which detects the splash direction and the amount of splashes of the actuation shaft 14, the summary of this invention is not limited to this and can also use the position sensor which belongs well-known [arbitration].

[0063] Moreover, in said example of the 1st operation gestalt, although the solenoid 15 was used as a driving means of the clamp member 16, the summary of this invention is not limited to this and can also use other means, such as an electromagnet, and oil pressure or an air actuator.

[0064] Furthermore, although it enabled it to operate the manual operation section 3 in the many directions using two electric motors 19a and 19b and two encoders 21a and 21b, it can make it possible to operate the manual operation section 3 only in the one specific direction in said example of the 1st operation gestalt using one electric motor and one encoder.

[0065] Hereafter, the example of the 2nd operation gestalt of the input unit for mount concerning this invention is explained using drawing 16 thru/or drawing 18. It is what is characterized by the input unit for mount of this example equipping device section 11A with a voice coil motor as an actuator for acting external force on the actuation shaft 14. The plan as for which device section 11A which drawing 16 requires for this example carried out the cross-section the part, the direction side elevation of X as for which device section 11A which drawing 17 requires for this example carried out the cross section the part, and drawing 18 are the direction side elevations of Y as for which device section 11A concerning this example carried out the cross section the part.

[0066] So that clearly from these drawings device section 11A of this example The base 12, the spherical bearing 13 prepared in the base 12 concerned, and the actuation shaft 14 with which spherical section 14a was prepared in the soffit section, and the spherical section 14a concerned was supported to revolve by said spherical bearing 13 free [a splash], Two L character members 22a and 22b arranged in the direction with which the actuation shaft 14 concerned is equipped, and which intersects perpendicularly mutually. Two voice coil motors 71 and 72 arranged on the axis which intersects perpendicularly in a field parallel to the base 12 focusing on said spherical bearing 13. Two brackets 73 and 74 which fixed, respectively to the moving part 71a and 72a of the voice coil motors 71 and 72 concerned. The connection pin 75 which carries out pin association of each [these] brackets 73 and 74 and said L character each members 22a and 22b pivotable. It consists of two position sensors 76 and 77 which detect the movement magnitude and the migration direction of said each brackets 73 and 74, and the manual scan section 3 is attached in the upper bed section of said actuation shaft 14.

[0067] To the point of the one side and said brackets 73 and 74 of the L character members 22a and 22b The pin insertion hole 78 which



the pin insertion hole 78 for inserting the connection pin 75 is established, and was established by L character member 22a, and the pin insertion hole 78 established by the bracket 73 are agreed. By penetrating the connection pin 75 to each of these pin insertion holes 78, these L character member 22a and a bracket 73 can be connected rotatable. Similarly the pin insertion hole 78 established by L character member 22b and the pin insertion hole 78 established by the bracket 74 are agreed, and these L character member 22b and a bracket 74 can be connected rockable by penetrating the connection pin 75 to each of these pin insertion holes 78.

[0068] The actuation shaft breakthrough 24 of the shape of a long hole for penetrating the actuation shaft 14 is established the other sides of these L character members 22a and 22b. In order that the breadth of this actuation shaft breakthrough 24 may make small the backlash produced between the actuation shafts 14, it is the range which can secure the smooth slide of the actuation shaft 14, and is formed in the value near the diameter of the actuation shaft 14 if possible. Moreover, the length of the actuation shaft breakthrough 24 is the same as the movable range of the actuation shaft 14, or is set as a bigger value than it.

[0069] The moving part 71a and 72a in which said brackets 73 and 74 were attached, and the moving part 71a and 72a concerned consist of fixed parts 71b and 72b constituted possible [ in-and-out ], and voice coil motors 71 and 72 are attached in the bracket 79 with which the back end section of fixed parts 71b and 72b was prepared in the base 12 possible [ turning ] through the universal joint 80. Therefore, regardless of to which location the actuation shaft 14 was operated, the load of the external force of the direction of Y can be carried out to the actuation shaft 14 through a bracket 74 and L character member 22b by driving a voice coil motor 71 by being able to carry out the load of the external force of the direction of X to the actuation shaft 14 through a bracket 73 and L character member 22a, and driving a voice coil motor 72. Of course, the load of the direction according to the output of each voice coil motors 71 and 72 and the external force of magnitude can be carried out to the actuation shaft 14 by driving voice coil motors 71 and 72 simultaneously. Thereby, a feeling of resistance and a feeling of acceleration can be given to actuation of the manual operation section 3, for example, arrest point regulation of the manual operation section 3 etc. can be performed in adjustment of the operating speed according to regulation of the actuation direction of the manual operation section 3, and the control input of the manual operation section 3, and a list.

[0070] Position sensors 76 and 77 consist of needles 76b and 77b by which insertion arrangement was carried out in the main parts 76a and 77a of a detector, the main part of detector 76a concerned, and 77a, and, as for Needles 76b and 77b, the end is attached in said brackets 73 and 74. As these position sensors 76 and 77, a photo interrupter, volume, etc. can use an optical [ which belongs well-known ], magnetic formula, and resistance-type sensor, for example, and the signal which is proportional to the splash direction and the amount of splashes of said actuation shaft 14 from a center valve position is outputted.

[0071] As shown in drawing 17 and drawing 18, the manual operation section 3 is formed in the knob form and can also equip the interior with the circuit board 32, a photo interrupter 33, and the 1st and 2nd switches 34 and 35 (refer to drawing 4) like the manual operation section 3 concerning the example of the 1st operation gestalt.

[0072] About other configurations, since it is the same as the input unit for mount concerning the example of the 1st operation gestalt, in order to avoid duplication, explanation is omitted.

[0073] since the input unit for mount concerning this example of an operation gestalt had the same effect as the input unit for mount

concerning the example of the 1st operation gestalt and also voice coil motors 71 and 72 were used for it, having used it as the actuator which carries out the load of the external force to the actuation shaft 14, a gear mechanism becomes unnecessary and it attains a miniaturization and low-cost-izing of equipment — things are made. Moreover, since having used voice coil motors 71 and 72 and the gear mechanism are unnecessary, and control of the oscillation which carries out a load to the actuation shaft 14 becomes easy and can give a predetermined feeling of resistance clearly by the operator, while being able to prevent beforehand the false drop of a mounted electrical machinery and apparatus, and the error of functional adjustment, it becomes easy to perform fine adjustment of the function of a mounted electrical machinery and apparatus.

[0074] Next, the example of the 3rd operation gestalt of the input unit for mount concerning this invention is explained using drawing 19 thru/or drawing 21. The input unit for mount of this example used the voice coil motor for device section 11B as an actuator for acting external force on the actuation shaft 14. And the plan of device section 11B which drawing 19 requires for this example by being characterized by enabling it to rock the actuation shaft 14 only to a specific one direction, the direction side elevation of X of device section 11B which drawing 20 requires for this example, and drawing 21 are the direction side elevations of Y as for which device section 11B concerning this example carried out the cross section the part.

[0075] So that clearly from these drawings device section 11B of this example The base 12, the spherical bearing 13 prepared in the base 12 concerned, and the actuation shaft 14 with which spherical section 14a was prepared in the soffit section, and the spherical section 14a concerned was supported to revolve by said spherical bearing 13 free [ a splash ]. One voice coil motor 71 arranged on the axis centering on said spherical bearing 13. The link member 81 which fixed to moving-part 71a of the voice coil motor 71 concerned. It consists of a connection pin 82 which carries out pin association of the link member 81 and said actuation shaft 14 concerned pivotable, and one position sensor 76 which detects the amount of splashes and the splash direction of said actuation shaft 14, and the manual scan section 3 is attached in the upper bed section of said actuation shaft 14.

[0076] Moving-part 71a in which said link member 81 was attached, and the moving-part 71a concerned consist of fixed part 71b constituted possible [ in-and-out ], and pin association of the turning of said voice coil motor 71 to the bracket 79 with which the back end section of fixed part 71b was prepared in the base 12 is enabled. The voice coil motor 71 of this example is also for giving a feeling of resistance to actuation of the manual operation section 3, for example, it is applied to arrest point regulation of the manual operation section 3 etc. at adjustment of the operating speed according to regulation of the actuation direction of the manual operation section 3, and the control input of the manual operation section 3, and a list. Moreover, said position sensor 76 consists of needle 76b by which insertion arrangement was carried out in main part of detector 76a, and the main part of detector 76a concerned, and, as for needle 76b, the end is attached in said link member 81.

[0077] About other configurations, since it is the same as the input unit for mount concerning the example of the 2nd operation gestalt, in order to avoid duplication, explanation is omitted. It has the same effect as the input unit for mount which the input unit for mount of this example of an operation gestalt also requires for the example of the 2nd operation gestalt.

[0078] Hereafter, the example of the 4th operation gestalt of the input unit for mount concerning this invention is explained using drawing 22 thru/or drawing 24. The input unit for mount of this example equipped device section 11C with the voice coil motor as an

actuator for acting external force on the actuation shaft 14. And the plan of device section 11C which drawing 22 requires for this example by being characterized by constituting so that the parallel displacement of the actuation shaft 14 may be carried out to the base 12, the direction side elevation of X as for which device section 11C which drawing 23 requires for this example carried out the cross section the part, and drawing 24 are the direction side elevations of Y of device section 11C concerning this example.

[0079] So that clearly from these drawings device section 11C of this example The base 12 and X-Y stage 91 prepared in the base 12 concerned. The actuation shaft 14 which fixed to X-Y stage 91 concerned, and the floating fastener 92 of the 2-way with which the actuation shaft 14 concerned was equipped. Two voice coil motors 71 and 72 arranged on the axis which intersects perpendicularly in a field parallel to the base 12 centering on the center valve position of said actuation shaft 14. Two sliders 93 and 94 which fixed to the moving part 71a and 72a of the voice coil motors 71 and 72 concerned, and were connected with said floating fastener 92 free [ sliding ]. It consists of two position sensors 76 and 77 which detect the movement magnitude and the migration direction of said actuation shaft 14, and the manual scan section 3 is attached in the upper bed section of said actuation shaft 14.

[0080] Direction rail of X 91a by which said X-Y stage 91 has been arranged towards the direction of X of the base 12, Direction slider of X 91b with which the direction rail of X 91a concerned was equipped free [ sliding ]. Direction rail of Y 91c which has been arranged towards the direction of Y of the base 12, and was formed in said direction slider of X 91b and one. It consists of direction slider of Y 91d with which the direction rail of Y 91c concerned was equipped free [ sliding ], and the actuation shaft 14 is being vertically fixed to the said direction slider of Y 91d upper surface. Therefore, the parallel displacement of the actuation shaft 14 can be freely carried out within the limits of [ movable ] X-Y stage 91 in a field parallel to the base 12.

[0081] The floating fastener 92 forms the concaves 95 and 96 of two articles which can slide on the sliders 93 and 94 which fixed to the moving part 71a and 72a of a voice coil motor in two sides which intersect perpendicularly, and is attached at a level with the actuation shaft 14. A slider 93 is set up in a concave 95 so that it may slide only in the direction of Y to a concave 95, and a slider 94 is set up in a concave 96 so that it may slide only in the direction of X to a concave 96. The moving part 71a and 72a in which said link member 81 was attached, and the moving part 71a and 72a concerned consist of fixed parts 71b and 72b constituted possible [ in-and-out ], and said voice coil motors 71 and 72 are being fixed to the bracket 79 with which the back end section of fixed parts 71b and 72b was prepared in the base 12.

[0082] Therefore, when the actuation shaft 14 is in every location on X-Y stage 91, the load of the external force of the direction of Y can be carried out to the actuation shaft 14 through a slider 94 and the floating fastener 92 by driving a voice coil motor 71 by being able to carry out the load of the external force of the direction of X to the actuation shaft 14 through a slider 93 and the floating fastener 92, and driving a voice coil motor 72. Of course, the load of the direction according to the output of each voice coil motors 71 and 72 and the external force of magnitude can be carried out to the actuation shaft 14 by driving voice coil motors 71 and 72 simultaneously. Thereby, a feeling of resistance can be given to actuation of the manual operation section 3, for example, arrest point regulation of the manual operation section 3 etc. can be performed in adjustment of the operating speed according to regulation of the actuation direction of the manual operation section 3, and the control input of the manual operation section 3,

and a list.

[0083] Position sensors 76 and 77 consist of needles 76b and 77b by which insertion arrangement was carried out in the main parts 76a and 77a of a detector, the main part of detector 76a concerned, and 77a, and Needles 76b and 77b are formed in the floating fastener 92 and one.

[0084] About other configurations, since it is the same as the input unit for mount concerning the example of the 2nd operation gestalt, in order to avoid duplication, explanation is omitted. It has the same effect as the input unit for mount which the input unit for mount of this example of an operation gestalt also requires for the example of the 2nd operation gestalt.

[0085] Hereafter, the example of the 5th operation gestalt of the input unit for mount concerning this invention is explained using drawing 25 thru/or drawing 27. The input unit for mount of this example equipped device section 11D with the voice coil motor as an actuator for acting external force on the actuation shaft 14. It is what is characterized by enabling it to rock having constituted so that the parallel displacement of the actuation shaft 14 might be carried out to the base 12, and the actuation shaft 14 only to a specific one direction. The plan of device section 11D which drawing 25 requires for this example, the direction side elevation of X of device section 11D which drawing 26 requires for this example, and drawing 27 are the direction side elevations of Y as for which device section 11D concerning this example carried out the cross section the part.

[0086] So that clearly from these drawings device section 11D of this example Direction slider of X 91b with which direction rail of X 91a prepared in the base 12 and the base 12 concerned and the direction rail of X 91a concerned were equipped free [ sliding ]. One voice coil motor 71 arranged on the axis of said direction rail of X 91a. The link member 81 which fixed to moving-part 71a of the voice coil motor 71 concerned. It consists of a connection pin 82 which carries out pin association of the link member 81 and said actuation shaft 14 concerned pivotable, and one position sensor 76 which detects the amount of splashes and the splash direction of said actuation shaft 14, and the manual scan section 3 is attached in the upper bed section of said actuation shaft 14.

[0087] Moving-part 71a in which said link member 81 was attached, and the moving-part 71a concerned consist of fixed part 71b constituted possible [ in-and-out ], and said voice coil motor 71 is being fixed to the bracket 79 with which the back end section of fixed part 71b was prepared in the base 12. The voice coil motor 71 of this example is also for giving a feeling of resistance to actuation of the manual operation section 3, for example, it is applied to arrest point regulation of the manual operation section 3 etc. at adjustment of the operating speed according to regulation of the actuation direction of the manual operation section 3, and the control input of the manual operation section 3, and a list. Moreover, said position sensor 76 consists of needle 76b by which insertion arrangement was carried out in main part of detector 76a, and the main part of detector 76a concerned, and needle 76b is attached in the actuation shaft 14.

[0088] About other configurations, since it is the same as the input unit for mount concerning the example of the 3rd operation gestalt, in order to avoid duplication, explanation is omitted. It has the same effect as the input unit for mount which the input unit for mount of this example of an operation gestalt also requires for the example of the 3rd operation gestalt.

[0089]

[Effect of the Invention] Since the input unit for mount of this invention was made to carry out the load of the external force beforehand set as the actuation shaft according to the control input

of the manual operation section from an actuator when the manual operation section was operated within movable limits which were able to be defined beforehand, by sensing the external force by which a load is carried out from an actuator, an operator can know the control input of the manual operation section sensuously, and delicate actuation of the manual operation section is attained. Therefore, the manual operation section is only operated to a spilling limit, it comes to be able to do usage of performing functional adjustment of the mounted electrical machinery and apparatus chosen not only the usage of choosing a desired mounted electrical machinery and apparatus but by adjusting the control input of the manual operation section, and the operability of the manual operation section, as a result the input unit for mount can be raised. Moreover, since it is the configuration which carries out the load of the external force of the predetermined reinforcement from an actuator to an actuation shaft, an actuation shaft or bearing is not damaged.

[0090] Since the input unit for mount of this invention was made to carry out the load of the external force beforehand set as the actuation shaft according to the actuation direction and control input of the manual operation section from an actuator when the manual operation section was operated in the direction of [other than the movable range which was able to be appointed beforehand] An operator can know the correction of the actuation direction of the manual operation section sensuously, and since it becomes possible to operate the manual operation section only within movable limits, the operability of the manual operation section is improved.

[0091] Since the input unit for mount of this invention held the actuation shaft free [a splash] to bearing, it can simplify the configuration of an actuation shaft attaching part, and can carry it out cheaply.

[0092] Since the input unit for mount of this invention fixes an actuation shaft to a slider and is slid on a rail top, it can operate an actuation shaft in a fixed flat surface along with a rail, and can make operability of an actuation shaft good.

[0093] Since the input unit for mount of this invention was made to carry out both-way actuation of the manual operation section only in a specific one direction, by carrying out both-way actuation of the manual operation section only in a specific one direction, it can perform selection of a desired mounted electrical machinery and apparatus, selected functional adjustment of a mounted electrical machinery and apparatus, etc., and can make operability of the manual operation section good.

[0094] The class of function which can be adjusted can also increase it while it can operate the manual operation section in the direction of arbitration in a specific field and can increase the number of the mounted electrical machinery and apparatus in which selection adjustment is possible, since the input unit for mount of this invention enabled it to operate the manual operation section in the direction of arbitration in a specific field.

[0095] Since the voice coil motor was used for it, having used the input unit for mount of this invention as the actuator which carries out the load of the external force to the manual operation section, the device for changing rotation of a motor into a both-way rectilinear motion becomes unnecessary, and it can attain a miniaturization and low-cost-izing of the input unit for mount.

[0096] Since the input unit for mount of this invention carries out the load of the oscillation of the mode which carries out the load of the big external force one by one to an actuation shaft from an actuator, or is different as the control input of the manual operation section becomes large, it can realize the control input of the manual operation section with blind touch, and can make operability of the input unit for mount better.

[0097] Since the input unit for mount of this invention carries out

the load of the external force more shocking than an actuator on an actuation shaft when operated to the actuation limit that the manual operation section was defined beforehand, it can realize with blind touch that the control input of the manual operation section reached till the critical point, and can make operability of the input unit for mount better.

[0098] The classification of the mounted electrical machinery and apparatus chosen by the input unit for mount of this invention connecting a position sensor to the display and the electric target with which the automobile was equipped through the computer with which the automobile was equipped, and operating the manual operation section, Since the content of the function of the mounted electrical machinery and apparatus concerned adjusted by operating the manual operation section and the activity of the manual operation section are displayed on a display While a passenger checks the content of a display of a display, functional adjustment of a mounted electrical machinery and apparatus can be performed, and functional adjustment of the electrical machinery and apparatus concerned can be ensured [promptly and].

[0099] Since the input unit for mount of this invention operates the sheet adjusting device for controlling the position of a driver's seat or a passenger seat in the manual operation section, it can perform necessary actuation with a hand using the manual operation section, and can carry out [easy]-izing of the position adjustment of a driver seat or a passenger seat.

[0100] Since the input unit for mount of this invention operates the tilt equipment and TERESUKO equipment with which the steering system for adjusting the height of a handle was equipped in the manual operation section, it can perform necessary actuation with a hand using the manual operation section, and can carry out [easy]-izing of the height adjustment of a handle.

---

## DESCRIPTION OF DRAWINGS

---

[Brief Description of the Drawings]

[Drawing 1] It is the perspective diagram showing the installation condition to the dashboard of the input unit for mount concerning the example of the 1st operation gestalt.

[Drawing 2] It is the plan showing the indoor condition of an automobile that the input unit for mount concerning the example of the 1st operation gestalt was attached.

[Drawing 3] It is the perspective diagram of the device section equipped with the manual operation section concerning the example of the 1st operation gestalt, and the manual operation section concerned.

[Drawing 4] It is the important section cross section seen from [where it has the manual operation section concerning the example of the 1st operation gestalt, and the manual operation section concerned / of the device section] the side.

[Drawing 5] It is the plan of the device section concerning the example of the 1st operation gestalt.

[Drawing 6] It is the plan of the manual operation section concerning the example of the 1st operation gestalt which removed covering.

[Drawing 7] It is explanatory drawing which illustrates the actuation direction of the manual operation section concerning the example of the 1st operation gestalt, and the classification of the mounted electrical machinery and apparatus chosen by it.

[Drawing 8] It is explanatory drawing which illustrates the

actuation direction of the manual operation section concerning the example of the 1st operation gestalt, and the classification of the function switched by it.

[Drawing 9] It is the block diagram showing the control system of the electric motor concerning the example of the 1st operation gestalt.

[Drawing 10] It is the table Fig. showing an example of the data table memorized by the memory with which the computer concerning the example of the 1st operation gestalt was equipped.

[Drawing 11] It is the flow chart which shows the control procedure of the electric motor concerning the example of the 1st operation gestalt.

[Drawing 12] It is a side view [which shows the mounting device of the input unit for mount concerning the example of the 1st operation gestalt over a dashboard] the flat surface — it is fracture drawing a part.

[Drawing 13] It is a side view [which shows the mounting device of the input unit for mount concerning the example of the 1st operation gestalt over a dashboard] the side — it is fracture drawing a part.

[Drawing 14] It is explanatory drawing which illustrates the menu of the mounted electrical machinery and apparatus displayed on the display concerning the example of the 1st operation gestalt.

[Drawing 15] It is explanatory drawing which illustrates the condition of the mounted electrical machinery and apparatus under functional adjustment displayed on the display concerning the example of the 1st operation gestalt.

[Drawing 16] It is the plan of the device section with which the input unit for mount of the example of the 2nd operation gestalt is equipped.

[Drawing 17] It is the direction side elevation of X of the device section with which the input unit for mount of the example of the 2nd operation gestalt is equipped.

[Drawing 18] It is the direction side elevation of Y of the device section with which the input unit for mount of the example of the 2nd operation gestalt is equipped.

[Drawing 19] It is the plan of the device section with which the input unit for mount of the example of the 3rd operation gestalt is equipped.

[Drawing 20] It is the direction side elevation of X of the device section with which the input unit for mount of the example of the 3rd operation gestalt is equipped.

[Drawing 21] It is the direction side elevation of Y of the device section with which the input unit for mount of the example of the 3rd operation gestalt is equipped.

[Drawing 22] It is the plan of the device section with which the input unit for mount of the example of the 4th operation gestalt is equipped.

[Drawing 23] It is the direction side elevation of X of the device section with which the input unit for mount of the example of the 4th operation gestalt is equipped.

[Drawing 24] It is the direction side elevation of Y of the device section with which the input unit for mount of the example of the 4th operation gestalt is equipped.

[Drawing 25] It is the plan of the device section with which the input unit for mount of the example of the 5th operation gestalt is equipped.

[Drawing 26] It is the direction side elevation of X of the device section with which the input unit for mount of the example of the 5th operation gestalt is equipped.

[Drawing 27] It is the direction side elevation of Y of the device section with which the input unit for mount of the example of the 5th operation gestalt is equipped.

[Drawing 28] It is inner surface drawing of the automobile in which

the example of installation of the input unit for mount concerning the former is shown.

[Drawing 29] It is the side elevation of the input unit for mount by which the conventional proposal is made.

[Drawing 30] It is the plan of the manual operation section of the input unit for mount shown in drawing 29.

[Drawing 31] It is the plan of the guide plate included in the input unit for mount shown in drawing 29.

[Description of Notations]

1 Input Unit for Mount

2 Case

3 Manual Operation Section

4a, 4b, 4c, 4d, 4e, 4f Push button switch

5a, 5b, 5c Push button switch

6 Volume Tongue

7 Card Slot

8 Disk Slot

11 Device Section

14 Actuation Shaft

15 Solenoid (Driving Means)

19a, 19b Electric motor (actuator)

21a, 21b Encoder (position sensor)

33 Photo Interrupter (Detection Sensor of Finger)

41 CPU

42 Collating Section

43 Table Selection Section

44 ROM

45a, 45b, and 45c ... Table

46 Position Signal Detecting Element

71 72 Voice coil motor (actuator)